DOCUMENT RESUME

ED 391 029 CE 070 595

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TITLE The Development of Technical and Vocational Education in Malaysia--A Case Study in Quality Improvement. Case Studies on Technical and Vocational Education in Asia and the Pacific.
INSTITUTION Royal Melbourne Inst. of Tech. (Australia).
SPONS AGENCY United Nations Educational, Scientific, and Cultural Organization, Paris (France).
REPORT NO ISBN-1-86272-453-9
PUB DATE 94
NOTE 23p.; For related documents, see CE 070 584-598. Product of the International Project on Technical and Vocational Education (UNEVOC).
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Case Studies; *Economic Development; Educational Change; *Educational Development; Educational Improvement; Foreign Countries; Government School Relationship; Industry; Job Training; Labor Force Development; Postsecondary Education; *School Business Relationship; Secondary Education; Shared Resources and Services; *Vocational Education
IDENTIFIERS *Malaysia

ABSTRACT

The economic profile of Malaysia has changed from an economy mainly based on agriculture and the production of tin ore to a more balanced economy with continuing growth in the manufacturing and industrial sectors. Educational programs need to be upgraded and improved, particularly the direction and development of technical and vocational education (TVE). The TVE system has responded accordingly. The tremendous growth in TVE facilities is in accordance with the increasing demand in the manufacturing and industrial sectors. The uplifting of the image of VTE is due to the corresponding increasing importance of employment in the industrial sectors, government's efforts at promoting VTE, and the changing nature of VTE programs. The government has been actively involved in the continued development of VTE programs. A cabinet committee assessed needs of VTE and recommended broad policy reforms to strengthen the current educational and training delivery system and improve the effectiveness and efficiency of skills training. The Ministry of Education has initiated programs promoting close linkages between VTE institutions and industries. Such linkages have been strengthened with the introduction of the "Time Sector Privatization Policy" plan that allows industries and the public to use training facilities for a fee during free times. (Three such TSP programs are included as case studies.) (YLB)

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CASE STUDIES ON TECHNICAL AND VOCATIONAL EDUCATION IN ASIA AND THE PACIFIC

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UNESCO UNEVOC
International Project on Technical and Vocational Education
Projet international pour l'enseignement technique et professionnel

CASE STUDIES ON TECHNICAL AND VOCATIONAL EDUCATION IN ASIA AND THE PACIFIC

The Development of Technical and Vocational Education in Malaysia — A Case Study in Quality Improvement

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First published 1994

ISBN 1 86272 453 9

Published by RMIT for UNESCO

The UNESCO UNEVOC Case Studies on Technical and Vocational Education in Asia and the Pacific project was managed by:
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Printed by:
Communication Services Unit
Royal Melbourne Institute of Technology
GPO Box 2476V
Melbourne
Victoria
Australia 3001

UNEVOC is the International Project on Technical and Vocational Education which was launched by UNESCO in August 1992. In the field of technical and vocational education, UNEVOC aims to foster the international exchange of ideas, experience and studies on policy issues; strengthen national research and development capabilities; facilitiate access to data bases and documentation; promote innovations in staff development; and support international cooperative actions.

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KEY FACTS

Area of Country – Malaysia covers a land area of 329,293 sq. km.

Population – is estimated at 18.6 million with a targeted growth rate of 3.2 per cent per year.

Title of Country – Malaysia.

Climate and Geography – Malaysia has an equatorial climate with fairly uniform temperatures throughout the year. Relative humidity range from 85 to 95 per cent. Malaysia comprises of Peninsular Malaysia and Sabah and Sarawak. Malaysia straddles across the South China Sea, with Peninsular Malaysia at the tip of mainland Southeast Asia and the states of Sabah and Sarawak on the island of Borneo.

Official Language(s) – Bahasa Melayu is the official national language and English is widely spoken.

Ruling Political Party – The ruling political party in power is the "Barisan Nasional" (National Front).

Head of Government – The Government is headed by the Prime Minister YAB Dato' Seri Dr. Mahathir bin Mohamad.

Currency Used – Ringgit Malaysia (RM).

Political System – Malaysia is a constitutional monarchy, its head of state being the Yang Di-Pertuan Agong. Malaysia practices parliamentary democracy with a bicameral parliament consisting of a Senate and a House of Representatives. Elections to the House of Representatives are held every five years. The Cabinet is headed by the Prime Minister consisting only members of the legislative and is collectively responsible to Parliament.

Education – The formal school system in Malaysia has a 6–3–2 pattern. This structure represents the primary, lower secondary and upper secondary levels respectively. Education at the tertiary level, both in the academic and professional fields, is provided by universities, polytechnics and colleges.

Social Welfare – Although Malaysia is by no means a welfare state, it offers a wide range of social services administered by the Government which are accessible to all including the poor. The Ministry if Education manages a comprehensive school system from primary to university. A comprehensive health service is run under the Ministry of Health. There is no uniform system of social welfare in the country. However there is considerable amount of legislation ensuring the protection of workers against sickness, accident and arbitrary dismissal. There are also legislation compelling employers and employees to contribute to provident funds.

Economy – The profile of the Malaysian economy has changed radically since Independence in 1957. Manufacturing has emerged as the leading economic sector followed by agriculture and mining. The share of the manufacturing sector in GDP has grown from 13.4 per cent in 1970 to 25.1 per cent in 1989, while that of the agricultural sector has declined from 30.8 per cent to 20.4 per cent over the same period.

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EXECUTIVE SUMMARY

THE CHANGING NATIONAL ECONOMIC PROFILE OF MALAYSIA AND CHALLENGES FOR HUMAN RESOURCE DEVELOPMENT

The economic profile of Malaysia has changed from an economy mainly based on agriculture and the production of tin ore to a more balanced economy with continuing growth in the manufacturing and industrial sectors. In line with the sectorial changes in the economy, job opportunities and human resource development plans have accordingly been reviewed. There is a need to upgrade and improve educational programmes, in particular the direction and development of technical and vocational education. As the continued expansion and technological needs of the manufacturing and industrial sectors progress there is a corresponding demand for technical and vocation education to meet both its "quantitative" and "qualitative" targets.

TECHNICAL AND VOCATIONAL EDUCATION IN MALAYSIA

The technical and vocational education system has responded accordingly. The tremendous growth in facilities is in accordance with the increasing demand in the manufacturing and industrial sectors. With the growth of the polytechnics and the technical and vocational schools Malaysia has been relatively successful in overcoming various issues in technical and vocational education commonly encountered by many developing countries. The "uplifting" of image of vocational education is due to the corresponding increasing importance of employment in the industrial sectors, the efforts at promoting vocational education by the government and the changing nature of vocational education programmes. In Malaysia, vocational education has progressed from very basic craft training of a narrow psychomotor nature to vocational education of today which encompasses high cognitive knowledge, the study of mathematics and the sciences and most importantly, is not terminal in nature.

The Government of Malaysia has noted the increasing importance of technical and vocational education and training and has involved itself very actively in the continued development of its programmes. A Cabinet Committee was established to conduct a comprehensive assessment of the needs of vocational education and to overcome the shortage of skilled manpower. In order to further strengthen the current educational and training delivery system and to improve the effectiveness and efficiency of skills training in the country, several broad policy reforms were recommended and at present is being implemented. It is recognised that the industrial and manufacturing sectors are important for the continued fast growth of Malaysia and the country cannot afford to have "skill bottlenecks" that may slow down economic development.

CASE STUDIES ON "POLICIES TO PROMOTE CLOSE LINKAGES BETWEEN TECHNICAL AND VOCATIONAL EDUCATION INSTITUTIONS AND INDUSTRIES"

It has been recognised that it is important for close linkages between technical and vocational education institutions and industries. Towards this direction, the Ministry of Education has initiated several programmes promoting these linkages. Such linkages were further strengthened with the introduction of the "Time Sector Privatisation Policy" plan (TSP). It is recognised that there are periods when facilities in training institutions are under-utilised, especially during after schooling hours and institutional term holidays. These "time sectors" represents periods where training facilities can be utilised by industries and the general public under a "privatisation" concept where fees are charged to cover usage and maintenance of the relevant facilities involved. Guidelines for the implementation of various types of TSP programmes

EXECUTIVE SUMMARY

have been formulated and several such projects have been successfully implemented. Three such programmes are selected as specific case studies for this UNEVOC project.

The first programme is a joint training project between the secondary vocational schools and SHELL Petroleum Company for the training of highly skilled welder who can weld to a welding position of 6GR. SHELL assisted in upgrading the facilities and equipment at the selected vocational schools. Selected vocational school instructors were given additional training in the SHELL welding section in their industrial plant. The second is a joint programme between another secondary vocational school and EON/PROTON, the national car manufacturer, to train motor mechanics specially to fit the needs and requirements of servicing and maintenance PROTON cars. The third programme is the TECHNO\SCHOOL, between a polytechnic and the Matsushita Electric Motor (M) Sdn. Bhd., a Japanese manufacturer. The TECHNO\SCHOOL was specially set up using the polytechnic lecturers to conduct an in-house designed programme to upgrade the staff of the Matsushita Electric Motor company.

The TSP programmes have been very successful in promoting and strengthening linkages between technical and vocational institutions and industries in Malaysia. In all cases both parties involved benefited. The TSP policy was able to provide a "vehicle" for the implementation of programs that improved linkages with industries. It established a symbiotic relationship between technical and vocational education institutions and industries. In Malaysia it has served to further strengthened the institutional-industry linkages.

ABBREVIATIONS

EON – An acronym for "Edaran Otomobil Nasional Berhad", the marketing company for the Malaysian national car.

GDP – Gross Domestic Product.

HRDF – Human Resource Development Fund.

LINK – an acronym for "Latihan Perindustrian Juru Kimpal", the title "Industrial Welders' Training" in the Malay language.

MAEM – Matsushita Electric Motor (M) Sdn. Bhd.

OPP1 – First Outline Perspective Plan.

OPP2 – Second Outline Perspective Plan.

POLIMAS – Polytechnic Sultan Abdul Halim Mu'adzam Shah.

PROTON – an acronym for "Perusahaan Otomobil Nasional Berhad", the manufacturing company for the Malaysian national car.

TSP – Time-Sector Privatisation.

6GR – A welding performance qualification indicating an advanced skill level for certain weld positions and types of weld.

1. THE CHANGING NATIONAL ECONOMIC PROFILE OF MALAYSIA

1.1 A REVIEW OF THE CHANGING NATIONAL ECONOMIC PROFILE

The economic profile of Malaysia has changed radically since the 1960s. At independence in 1957, Malaysia had an economy mainly based on agriculture and the production of tin ore. Today it possesses a more balanced economic profile, with tremendous continuing growth in the manufacturing and services sectors. The national economic profile has undergone major changes over the last two decades. Today it has achieved a better balance between the agriculture, industry and services sectors.

Agriculture and forestry, which accounted for 29 per cent of the national GDP in 1970 dropped to 18.7 per cent in 1990. Mining, which accounted for 13.7 per cent of the GDP in 1970 dropped to 9.7 per cent in 1990. On the other hand, manufacturing which accounted for only 13.9 per cent of the GDP in 1970 increased to 27.0 per cent in 1990. The services sector, which accounted for 36.2 per cent of the GDP in 1970, increased to 42.3 per cent in 1990. As a result of the changing economic profile the employment pattern has similarly changed.

Agriculture and forestry, which accounted for 53.5 per cent of total employment in 1970, dropped to 27.8 per cent of total employment in 1990. Manufacturing increased its share of total employment of 8.7 per cent in 1970 to 19.5 per cent in 1990 (Table 1). For the period 1970 to 1990, the manufacturing sector registered the highest average growth rate of 10.3 per cent. This reflected the continuing stress and importance placed on the manufacturing sector. This changing national economic profile is planned for and will continue through the next few national development plans.

Table 1

OPP1 Sectoral Targets and Achievements

Sectors	Sectoral Share in 1970	Targets for 1990	Achieved In 1990
Share of GDP (%)			
Agriculture and forestry	29.0	19.7	18.7
Mining	13.7	2.6	9.7
Manufacturing	13.9	26.2	27.0
Construction	3.8	4.7	3 5
Services	36.2	48.3	42.3
Proportion to Total Employment (%)			
Agriculture and forestry	53.5	35.1	27.8
Mining	2.6	1.5	0.6
Manufacturing	8.7	16.8	19.5
Construction	2.7	3.6	6.4
Services	32.5	43.0	45.7

Source : Extracted from OPP2, Table 2-3, page 41

The national economic development of the country is charted by a long-term national development plan known as the Outline Perspective Plan. The First Outline Perspective lan (OPP1) covers the years 1971 to 1990. A Second Outline Perspective Plan (OPP2) has been formulated for the years 1991 to 2000. The economic progress achieved through the OPP1 and planned development under the OPP2 will give a clear understanding of the progress, economic shift and direction of the economic profile of Malaysia.

1.2 A REVIEW OF THE NATIONAL ECONOMIC GROWTH

During the seventies, the national economy grew at a rapid rate of 7.5 per cent per annum. The world recession slowed the national economic growth to 5.9 per cent per annum in the eighties. The OPP1 period signalled the start of the changing economic profile of the country. The composition of exports showed distinct changes. The export of rubber declined from 33.4 per cent in 1970 to only 3.8 per cent in 1990. The export share of oil and gas increased from 4.0 to 16.2 per cent. The biggest change was achieved through manufactured exports, which rose from 12.0 per cent in 1970 to 60.4 per cent in 1990, a very significant increase of 48.4 per cent.

2. DEVELOPMENT THRUST AND GROWTH PROSPECTS FOR THE 1990's

2.1 DIRECTION OF ECONOMIC DEVELOPMENT IN THE 1990S

As the country progresses through the nineties, the OPP2 has charted the direction of the national economic development from 1991 through 2000. The high growth trend of the seventies and the eighties is expected to continue by an average of 7 per cent per annum. The manufacturing sector is expected to lead the continued change towards an industrial-orientated economy. Manufacturing exports are projected to account for about 81 per cent of total exports by the year 2000 while the share of agricultural exports will decline to 6 per cent.

2.2 NATIONAL ECONOMIC PROFILE OF THE 1990S

A similar change in the employment profile is expected to follow the change in the economic profile of the country. Employment is projected to grow by 3.1 per cent per annum and there is expected to be a substantial outflow of labour from the traditional agricultural based sectors to the fast growing sectors of commerce and industry. The change follows the expected further reduction of the agricultural sectors and the corresponding expansion of the industrial and manufacturing sectors.

3. PROJECTION OF EMPLOYMENT ESTIMATES BY SECTORS AND HUMAN RESOURCE DEVELOPMENT

3.1 PROJECTION OF JOB OPPORTUNITIES UNDER THE NEW DEVELOPMENT THRUST

In line with the sectorial changes in the economy, job opportunities will change accordingly. The manufacturing and services sectors will continue to need increased manpower requirements. The largest share of new employment will come from the services sector and the manufacturing sector. The manufacturing sector is projected to account for 36 per cent of the new jobs to be created by the year 2000. On the other hand, the share of employment in the agricultural sector is expected to decline from 28 per cent to 20 per cent in line with the structural changes taking place in the national economy (Table 2).

The sectorial job requirements indicated by the OPP2 are as follows:

Table 2

Occupational Structure 1990 and 2000

Sector	1990 ('000)	1990 (%)	2000 ('000)	2000 (%)	New Jobs ('000)	New Jobs (%)
Agriculture, Forestry, Livestock and Fishing	1,837.6	27.8	1,799.9	20.0	-37.7	-1.6
Mining and Quarrying	39.1	0.6	42.3	0.5	3.2	0.1
Manufacturing	1,290.2	19.5	2,143.9	23.9	853.7	36.1
Construction	426.9	6.4	664.4	7.4	237.5	10.0
Services	3,027.2	45.7	4,335.8	48.2	1,308.6	55.3
a. Electricity gas and water	45.9	0.7	50.2	0.6	4.3	0.2
b. Transport, storage and communication	285.4	4.3	410.5	4.6	125.1	5.3
c. Whole and retail trade hotels and restaurants	1,239.4	18.7	2,049.8	22.8	810.4	34.3
d. Finance, insurance, real estates and business service	231.3	3.5	306.5	3.4	75.2	3.2
e. Government services	850.2	17.8	894.2	10.0	44.0	1.9
f. Other services	375.0	5.7	624.6	7.0	249.6	10.6
TOTAL	6,621.0	100.0	8,986.3	100.0	2,365.3	100.0

Source: Extracted from OPP2, Table 6-2, Page 161

3.2 HUMAN RESOURCE DEVELOPMENT

The OPP2 has indicated that during the decade of the nineties, human resource development will assume new importance. Competitiveness, productivity, innovativeness and capability in management of new technologies in Malaysia will be determined by the quality of its human resource development. The OPP2 identifies the following two factors that will be important and must be taken into consideration in human resource development in the decade to come:

- a productive and efficient labour force must be developed with strong ethical and moral values and a commitment to excellence, and
- increasing globalisation and internationalisation of the world economy will require the national economy to become more competitive and efficient.

3.3 DIRECTION AND CHALLENGES FOR HUMAN RESOURCE DEVELOPMENT

The various factors above, combined with the more "cognitive nature" of vocational education today, and an increasing sophistication of the Malaysian industry, have made more urgent the need for a new direction of development for technical and vocational education in Malaysia.

With the increasing share and continued growth of the various manufacturing sectors of the economy, technical, vocational and industrial training have taken on a role of utmost importance. Increasing demands and requirements placed on training must be met in order not to slow down the rate of growth of the industrial and manufacturing sectors. Today, in Malaysia, technical and vocational education needs to meet both its quantitative and qualitative targets.

The manufacturing sector is considered important in terms of "value adding". It is also noted that the rate of labour absorption in the sector will decline in line with expected increasing plant modernisation and automation. This will result in requirements for skill upgrading, moving away from very basic simple traditional psychomotor skills towards more cognitive, higher level skills. This is being recognised and training is expected to be further strengthened with a stronger emphasis on related mathematics, sciences and technology.

In view of the challenges ahead, Malaysia should be well-equipped with a strong base in education and training. There is a need to continuously upgrade and improve education and training programmes. The OPP2 calls for an emphasis on the development of science, mathematics, manipulative and communicative skills as well as proficiency in English so that school leavers can be more readily acceptable for employment and further training by their employers.

It is generally recognised that technical and vocational education and related human resource development programmes must be able to meet the needs of the Malaysian industry. - It must not be allowed to become a "bottleneck and be a hindrance towards the continued pace of industrial development in the country. This is critical for continued national growth.

It is projected that the professional and technical category will require 320,000 personnel during 1991 to 2000 of whom 48 per cent will be in the technical occupations. It is also projected that the expected upgrading of production technology from simple assembly and process-type operations to the more sophisticated automated and higher "value-added" processes will generate a demand of 153,000 engineers and engineering assistants (Table 3). Rapid industrialisation of the economy will place new demands on high-level technical skills, management and entrepreneurial capabilities as well as increased technological development and improved capital utilisation. The thrust of human resource development under the OPP2 will be to meet the objectives of economic growth. The technical and vocational training system of the country will therefore have to be aligned accordingly to meet these challenges in human resource development.

Table 3

CAPACITY OF LOCAL INSTITUTIONS TO MEET THE DEMAND FOR SELECTED PROFESSIONAL AND TECHNICAL OCCUPATIONS 1991 – 2000

Occupation	Stock 1990	Employment 2000	Net Increase 1991–2000	Output 1991 – 2000 Local Public	Local Private
ENGINEERS	26,500	56,600	30,100	21,000	-
Civil	11,100	19,500	8,400	3,700	-
Electrical and Electronics	6,200	14,600	8,400	4,200	-
Mechanical	5,200	10,800	5,600	4,000	-
Chemical	800	2,000	1,200	900	-
Others	3,200	9,700	6,500	8,200	-
ENGINEERING ASSISTANTS	72,400	195,300	122,900	84,070	20,900
Civil	27,100	58,500	31,400	20,400	600
Electrical and Electronics	32,300	75,900	43,600	21,200	8,800
Mechanical	6,400	32,400	26,000	11,600	9,600
Chemical	600	6,000	5,400	570	-
Others	6,000	22,500	16,500	30,300	1,900

Source: Extracted from OPP2, Table 6-5, Page 167

4. EXISTING TECHNICAL AND VOCATIONAL EDUCATION SYSTEM IN MALAYSIA

4.1 GENERAL EDUCATION SYSTEM IN MALAYSIA

The formal school system in Malaysia has a 6 – 3 – 2 structure. A child at age six years plus starts a six year primary education, then moves to three years of lower secondary education followed by two years of upper secondary education. A student either enters the world of work at the end of the 6 – 3 – 2 education structure or proceeds for another two years of post-secondary education, or to other forms of tertiary education at colleges, polytechnics, further education and training institutes and universities.

As at January 1993, there are 6,909 primary schools with a total enrolment of 2,698,577 students and 1,408 secondary schools with a total enrolment of 1,490,389. At the tertiary education level there are eight universities with a total student population of 70,000. In addition there is also an institute of further education and training.

4.2 A REVIEW OF THE EXISTING TECHNICAL AND VOCATIONAL EDUCATION SYSTEM

At the primary level, students are introduced to pre-vocational subjects covering various aspects of manipulative skills. At the lower secondary level, pre-vocational education is continued through a Living Skills subject, which further exposes students to various areas of simple vocational skills. At the upper secondary level, a student follows a course structure that covers several core subjects for the languages, mathematics and sciences. In addition to the core subjects, the student is required to take several additional subjects from a choice of several elective groups. Among the several elective groups is a vocational and technology group that offers a choice of technical subjects covering engineering studies, commerce, home economics and agriculture science. Subjects in this vocational and technology elective group are basically for further exposure to technical studies and are pre-vocational in nature.

The formal technical and vocational education system under the Ministry of Education starts at the upper secondary level, where there are 70 secondary vocational schools with an enrolment of 33,751 students and nine secondary technical schools having a total of 5,339 students. The secondary vocational schools offer a course structure that covers the same core subjects as in other upper secondary academic schools. In addition to these core subjects, the vocational school students select a group of vocational subjects in accordance with the vocational course are following. Vocational studies make up about 50 per cent of the total course content in the secondary vocational school. In the secondary technical schools, the subject offerings are more science- and mathematics-based in nature and technical subjects offered are less practical in nature. Technical studies make up only about 17 per cent of the total course content in the secondary technical school.

At the post-secondary level there are six polytechnics with a student population of 15,000 with about 12,000 students undergoing courses at the certificate level and 3,000 students at the diploma level. The objective of the polytechnics is to produce trained manpower at the semi- professional level in various areas of engineering and commerce. At the certificate level about 80 per cent of the students are following engineering courses, while at the diploma level 50 per cent of the students are undergoing engineering courses. Female students make up about 25 per cent of the total student population.

Other Government Training Agencies

Although technical and vocational education at the schools and polytechnics is directly administered by the Technical and Vocational Education Division of the Ministry of Education, training activities at both technician/sub-professional and craft levels are also carried out by other Government Ministers, Departments and Agencies for specific needs. Sub-professional certificate courses are also conducted by the MARA Institute of Technology, Tunku Abdul Rahman College while sub-professional diploma level courses are conducted by the MARA Institute of Technology, Tunku Abdul Rahman College, University of Technology Malaysia and the Agricultural University of Malaysia.

Other Government training agencies involved in craft level courses are as follows:

a) Ministry if Labour – Industrial Training Institutes

b) MARA – Skills Training Institutes

c) Ministry of Youth and Sport – Youth Training Centres

d) Ministry of Welfare Services – Training Centres

The Ministry of Agriculture conducts training to produce Junior Agricultural Assistants at the Agricultural Institute. The Standards and Industrial Research Institute of Malaysia (SIRIM) conducts training in various specialised fields for both public and private sectors. The National Productivity Centre conducts training in administration and management for both the public and private sectors. In addition, Government departments and agencies such as the Public Works Department, the National Electricity Board, the Telecommunications department and the Malaysian Railways have their own training schools conducting mainly in-service and up-grading type of courses for their respective needs.

4.3 ISSUES IN TECHNICAL AND VOCATIONAL EDUCATION

The Position of Vocational Education: In many developing counties. vocational education has somehow been relegated to the bottom of the educational hierarchy . This may not be so for technical and vocational education programmes at the tertiary level but is true in most cases for vocational programmes at the craft and trade training levels. This is in spite of the fact that the rapid development of science and technology in our present times requires education to prepare students to face technological changes and to be relevant to the world of work. Vocational education has a major role to play, especially if technology is to be applied to the problems of development, in terms of skilled and trained manpower to carry out the task of economic development.

In Malaysia, the initial resistance to vocational education programmes, especially in the early years of introduction of trade schools and village extension schools, has been replaced with a more ready acceptance by the general society of today. This "uplifting" of image of vocational education is due to the corresponding increasing importance of employment in the industrial sectors, efforts at promoting vocational education by the government and the changing nature of vocational education programmes. In Malaysia, vocational education has progressed from very basic craft training of a narrow psychomotor nature to vocational education of today which encompasses high cognitive knowledge, the study of mathematics and the sciences and, most importantly, is not terminal in nature. In most developing countries, the question of the position of vocational education needs to be properly addressed in order to be able to attract the correct types of students into vocational education programmes. Vocational education is expensive and many areas of present day vocational education is highly cognitive in nature. Students who chose to enter vocational education of today must have the capability to follow such course content. Otherwise the "wastage" from the training programme and for the students will be tremendous. Planners and administrators of national educational systems and the society in general, need to be aware of this changing trend. This is important for the rapid technical progress necessary for industrial development.

The Vocational Education Curriculum: Needless to say, such programmes must always be consistent with the needs and requirements of local industries and the direction of planned national development of the country. The direction of planned national development is important as in many cases, the lag time required for implementation of vocational education programmes is substantial and if not planned in line with the direction of future national developments, will be found to be lagging behind in training content and equipment.

The Broad-Based Vocational Education Curriculum: The amount of literature and arguments on this issue are as old as vocational education itself. However, the need for a broad-based curriculum is being increasingly justified as the changing trends in industry are slowly but surely reinforcing this position. A brief restatement of the need for a broad-based curriculum in vocational education is as follows:

(a) It is necessary to provide a broad foundation that gives would-be workers greater flexibility and resilience to changes in technology and changes in the employment market. It is a guard against "technological obsolescence".

(b) Technology is becoming more complex and the need is increasingly towards more maturity and lower

initial training. The curriculum should be directed towards a preparation of students that is initially broader in nature in order to facilitate more "in-house" specialised training in the later stages if necessary. In Malaysia the role of in-house specialised training will increase with the introduction of the Human Resource Development Fund (HRDF) where companies will find it "profitable" to conduct in-house training for its own specialised needs.

(c) Modern technologies need workers with a broader breadth of view, more knowledge and skills, and a greater adaptability to change. Many vocational areas of today require knowledge in more than one area. Industrial changes today are reducing or eliminating old skills and are creating demands for new types of skills. "Vocational mobility" is increasingly important in today's world of changing technology. The uneducated or the narrowly trained become obsolete. The cost of formal retraining is prohibitively high and very time consuming and tends to be very inefficient in a vocational education system.

In Malaysia, vocational education programmes conducted by the Ministry of Education have purposely taken a broad-based approach. This broad-based and non-terminal approach in vocational education can be credited as the reason for the continued success and popularity of its vocational education programmes when many other more narrow-based and terminal programmes have difficulty attracting students.

The main issues above dominated the early years of development of technical and vocational education in Malaysia. Today, technical and vocational education is in a more established position and is more readily accepted by society. As the country's technical and vocational education programmes grow, new issues are facing decision makers. Some issues are structural in nature and others are directed towards making the technical and vocational education system more efficient. To better address these issues, a Cabinet Committee on Training was established. These issues on technical and vocational education and training relevant to Malaysia will be further elaborated by the following discussion on the Cabinet Committee on Training.

5. THE CABINET COMMITTEE REPORT ON TRAINING

5.1 REVIEW OF THE CABINET COMMITTEE REPORT ON TRAINING

The Government of Malaysia has noted the increasing importance of technical and vocational education and training and has involved itself very actively in the surrounding issues.

A special Cabinet Committee was established in 1991 to undertake the following activities:

- to collect and compile detailed information on the types of skills required in six industries, viz. electric and electronic, textile, construction, manufacturing, information technology and wood-based industries,
- to conduct a comprehensive assessment relating to the shortage of skilled manpower, especially in the private sector, as well as to provide a trend analysis on the skill requirements, and
- to present specific recommendations to overcome the problems of shortage of skilled manpower.

The industries identified above represent the future areas of needs of the Malaysia industrial development programme. The Cabinet Committee made a very extensive study and identified four policy thrusts and several policy recommendations and measures to be taken.

5.2 RECOMMENDATIONS OF THE CABINET COMMITTEE REPORT ON TRAINING

The Cabinet Committee on Training made a detailed study of the technical and vocational education and training system in relation to the needs of the country. From its study four main features were highlighted.

(a) While the rapid growth in industrial activities has resulted in an increased demand for skills on the supply side, the training institutions have been unable to meet these demands due to various rigidities.

(b) Rapid technological changes in the production process require significant changes in the skills required by the affected industries. Consequently, there is a need for flexibility using skill supply mechanisms to respond to the changing skill requirements. In particular, skill upgrading/retraining of the existing workforce in addition to pre-employment training needs to be enhanced.

(c) In addition to basic formal training much of the required skills that are short in supply have to be acquired on-the-job.

d) Existing government training institutions are not market driven. Market demand for skills are not well monitored and the mechanism for ensuring relevance of output is inadequate.

In order to further strengthen the current educational and training delivery system, several broad policy reforms are recommended. These reforms seek to improve the effectiveness and efficiency of skills training in the country. They are grouped together under three areas of policy thrust as follows:

Improving the Responsiveness of Public Training to Market Demands: The ability for institutions to respond quickly and effectively to changing patterns of skill employment constitutes a key factor in improving efficiency in the utilisation of public training capacity. For public training to be more responsive the development of mechanism for feedback response on skill requirement and the effectiveness of training is essential.

Under this areas of policy thrust the following are recommended:

- reorientation of the value system,
- establishing feedback mechanisms,
- greater flexibility in management of education and training institutes,
- attracting and retaining quality trainers/instructors,
- fuller utilisation of education and training institutes,
- corporatisation of training institutes,
- constant review of course design and curriculum, and
- wider dissemination of labour market information.

Expanding the Role of the Private Sector: The role of the private sector is important as they are best placed to identify the training needs for skill upgrading and retraining. They can also identify the technology that is being used in industry as well as acquire expertise in the usage of technology from vendors. In this area of policy thrust, the following are recommended:

- increasing collaboration with the private sector,
- improving incentives for training, and
- establishing specialist training centres.

Strengthening Linkages between Training and Technological Change: It is recognised as important that Malaysian workers are able to face the challenge of absorbing and adjusting to newer technologies in industry, as well as to foster the creation of a forward-looking Malaysian society which is supportive of and contributes to invention, innovation and technological advancement. To ensure this, it was decided that there should be a policy thrust towards strengthening linkages between training and technological changes. In order to achieve this, the following three measures are recommended:

- establishing centres of excellence,
- expanding the accreditation of skills, and
- establishing a national information technology board.

The industrial and manufacturing sectors are important for the continued fast growth of Malaysia. The country cannot afford to have "skill bottlenecks", and the recommendations of the Cabinet Committee on Training are not only directed towards ensuring increased skill output, but also to fulfil the qualitative aspects of future manpower requirements of a fast industrialising Malaysia. Many of the short-term recommendations have already been implemented and the Cabinet Committee meets regularly to monitor and ensure that all relevant recommendations and measures are implemented.

6. CASE STUDIES ON POLICIES TO PROMOTE CLOSE LINKAGES BETWEEN TECHNICAL AND VOCATIONAL EDUCATION INSTITUTIONS AND INDUSTRIES

The Cabinet Committee Report on Training has elaborated on the need for close linkages between technical and vocational education and industries. The Ministry of Education has initiated several programmes towards promoting these linkages. Several joint programmes between technical and vocational institutions and industries have been implemented. This policy thrust was further strengthened with the introduction of the Time Sector Privatisation Policy.

6.1 BACKGROUND AND CONCEPT OF TIME SECTOR PRIVATISATION

At present, there are 70 secondary vocational schools, nine secondary technical schools and six polytechnics under the Ministry of Education in Malaysia. It is recognised that there are periods when training facilities existing in these institutions are under-utilised, especially during after- schooling hours, e.g. in the late evening and at night and during institutional term holidays. These "time sectors" represent periods where training facilities can be utilised by industries and the general public under a "privatisation" concept where minimal fees are charged to cover usage and maintenance of the relevant facilities involved. Under this concept, both the public institutions and the industries benefit, as it leads to better utility rate of facilities and increased collection of funds by the institutions and the industries get "training time" on facilities for their in-house and other specific needs.

Time Sector Privatisation (TSP) represents a programme of co-operation that allows the industrial sector and the public to make use of training facilities in the secondary vocational schools, the secondary technical schools and the polytechnics. It represents a "symbiotic relationship" between the institution and industry and more importantly serve towards strengthening linkages between technical and vocational institutions and industries.

6.2 TYPES OF TSP PROGRAMMES

It is recognised that for such a programme to work there must be flexibility in its implementation, the willingness to accommodate individual needs and minimal central control and regulations. Initiative, good administration and support, and a strong institution–industry linkage are factors vital for the success of the TSP programme. TSP programmes need to be recognised as beneficial to both the institution and the industry or particular factory involved.

In order to facilitate the implementation of the TSP programme and to assist the institutions and industries operationalise the concept, guidelines on three types of TSP programmes have been formulated. The three TSP programmes are:

Joint Training Programmes: These programmes are implemented through co-operation between the institution and industry. Industry will provide the necessary contributions, through financial grants, equipment and technical assistance and the institution will provide the require workshop facilities and space. Course participants, instructional staff and course contents will be formulated jointly by the industry and institution involved.

Customised Training Programmes: These training programmes are implemented according to the needs of a particular industry or private entity. Instructional staff can come from either the industry or from the institution. Course participants are from among the identified staff members of the company who will be in need of the competencies to be developed through these programmes. Facilities such as basic equipment and workshop space will be provided by the institution. Course fees or financial contributions are to be determined jointly, by both the industry and the institution.

Modular Training Programmes: Courses offered under this programme are courses that individual institutions are capable of implementing depending on available facilities and instructional staff. They are usually short modular courses that have popular appeal or demand. Course participants and course fees are to be determined by the institutions themselves.

The guidelines above are formulated not towards restricting the implementation of TSP programmes but rather to assist both institutions and industries, and to make both parties more aware of the possible areas and forms of co-operation available. The guidelines have been useful in the operationalisation of the TSP concept at the institutional level.

Among the many TSP programmes that have been implemented, three programmes are selected as specific case studies for this UNEVOC project. The first is a joint secondary vocational school and SHELL petroleum industry programme to produce highly skilled welders. The second is a joint programme between another secondary vocational school and EQN/PROTON, the national car manufacturer, to train motor mechanics, especially to fit the needs and requirements of servicing and maintenance of PROTON cars. The third programme is the TECHNO-SCHOOL, between a polytechnic and Matsushita Electric Motor (M) Sdn. Bhd., a Japanese manufacturing factory. The TECHNO-SCHOOL is set up specifically for in-house training and upgrading of the factory staff.

6.3 THE LINK PROJECT

The LINK project is an acronym of "Latihan Perindustrian Juru Kimpal", the title "Industrial Welders' Training" project in the Malay language. The rapid development of the petroleum industry and its related support industries and "down-stream" activities have highlighted the need for highly trained skilled welders. Welders are required in petroleum and gas pipeline construction, the construction and maintenance of oil production platforms and in the continued expansion and building of oil and gas refineries. These activities require highly-trained welders who can weld to a welding position of 6GR. In order to produce the required welders for the petroleum industry, the SHELL Petroleum Company, together with a secondary vocational school in Sarawak, an east-coast state in Malaysia, initiated the LINK Project.

Prior to the implementation of the LINK project, the vocational school had existing basic welding facilities and conducted a basic welding course. These facilities were insufficient to conduct a welding programme to a 6GR level. The existing welding instructors in the vocational school were also not able to conduct a training programme to the 6GR level in welding.

The Ministry of Education, together with SHELL, upgraded the facilities in the welding workshop. Infrastructure and heavy current electrical supply were upgraded. SHELL contributed equipment and materials. Selected welding instructors at the secondary vocational school were sent for a five month intensive training course at the welding section in a SHELL industrial plant. Through this skill upgrading course the welding instructors were equipped with the required skills to conduct the 6GR level training programme. On their return, these instructors were able to conduct the 6GR welding programme at the vocational school. The LINK programme started at one vocational school in Sarawak in January 1991. In July 1991, the LINK programme was started at another vocational school in Sabah. Each vocational school can take 24 trainees and needs a period of intensive training of six months to equip the trainees with welding skills to a level of 6GR. Through this LINK project, 48 highly trained welders are produced every six months. The petroleum and gas industry and its related support manufacturers and contractors now have a ready source of supply of welders. To date, the LINK project has been a success and is an example of a TSP project where the private industrial sector and the training institution both contribute towards the initiation and running of a specific training programme in an area of need.

6.4 EON MOTOR MECHANICS TRAINING PROGRAMME

EON is the distributor of the national car PROTON. Due to the progress of sales of the national car PROTON, the distribution network throughout the country is unable to cope with the demand for servicing and maintenance work. This is mainly due to the lack of motor mechanics trained specifically for service work on the PROTON cars. The national car manufacturer runs a training school but this training school is unable to cope the demands for specially trained motor mechanics specialising in PROTON cars. The Ministry of Education has over 50 vocational schools that have facilities for automotive courses. These vocational schools are well-equipped for motor mechanic training. A TSP programme was worked out between EON and the Ministry of Education. Nine secondary vocational schools were selected to participate in this programme. The secondary vocational school in Kajang specialising in automotive was chosen as "lead school" for the programme.

EON conducted a special programme to orientate selected vocational school automotive instructors on PROTON cars. EON and PROTON also donated used cars, engines and other related specialised servicing tools for use on PROTON cars to the nine "adopted" secondary vocational schools selected to participate in this programme. A special modular course content was developed between the vocational schools and EON in order to bridge the gap between the competencies possessed by vocational school graduates and the specialised skills required by EON in order to carry out specialised automotive servicing work. In December 1993, the first group of 40 students were selected to participate in this training programme. During the six-month training period, the selected students receive a training allowance from EON. On successful completion of their programme the students will be posted as automotive mechanics to EON service centres located throughout the country.

This TSP project between the secondary vocational schools and an automotive manufacturer and distributor is a co-operative effort to prepare specialised automotive mechanics to meet the needs of this industry. The project has served to strengthen the link between technical and vocational education and industries and is of benefit to both the participating secondary vocational schools and the automotive manufacturer.

6.5 THE TECHNO-SCHOOL TRAINING PROGRAMME

The TECHNO-SCHOOL Training Programme is a joint training programme between the Sultan Abdul Halim Mu'adzam Shah Polytechnic (POLIMAS) and Matsushita Electric Motor (M) Sdn. Bhd (MAEM). POLIMAS is a post-secondary technical institution conducting two-and three-year courses in various areas of engineering. MAEM is a Japanese owned factory producing motors and electrical components. The TECHNO-SCHOOL programme is jointly organised and conducted by both POLIMAS and MAEM.

After several years of operation, MAEM had a need to upgrade their technical personnel and to equip them with "multi-skills". The continuing upgrading and sophistication of operation in MAEM required technical personnel with competencies in both mechanical and electrical areas. The polytechnic is well-equipped in both areas of engineering. It has laboratories and workshops equipped for these areas. The TECHNO-SCHOOL programme covers a length of six to seven months and the course contents cover electric circuits, relay sequence control, programmable controller, machine assembly, electronic contactless sequence, industrial materials and equipment maintenance. These areas were identified as competencies required by the technical personnel of MAEM. Classes were conducted at POLIMAS using POLIMAS facilities and teaching staff. Classes for laboratory activities were carried out outside their normal teaching hours, on Saturdays and Sundays from 9.00 am to 6.00 pm. Theory classes were conducted at MAEM on Fridays from 5.30 pm to 9.00 pm. Class hours were arrange to suit both the MAEM staff and the POLIMAS staff involved in the programme and did not disrupt either company or polytechnic activities.

6.6 PROMOTING CLOSER LINKAGES BETWEEN TECHNICAL AND VOCATIONAL EDUCATION INSTITUTIONS AND INDUSTRIES

The above three TSP programmes have been very successful in promoting and strengthening linkages between technical and vocational education and industries. In all cases, both parties involved benefited. The educational institution gained in terms of equipment and an upgrading of facilities and some financial compensation. Lecturers and instructors in technical institutions also benefited as joint programmes gave them better knowledge and experience of the needs and requirements of industries. This itself will make them better teachers and through this, both the institution and its students stand to gain. It must be recognised that such linkages will benefit both technical and vocational education and industries. Such linkages must not be perceived as a burden by industry.

In the three case studies above the industry partners were able to successfully carry out their required staff training and upgrading programmes with no disruptions to company activities and as a result achieved better productivity and enhanced their technical staff competencies. Many industries do not have the capability, space or resources to setup and maintain training facilities and programmes, although these are admitted as much needed. Having nearby technical and vocational institutions available to them has solved many of their problems in staff training.

The Technical and Vocational Education Division of the Ministry of Education considers the promotion of close linkages between technical and vocational institutions and industries as very important and is promoting it through the TSP programme. A policy statement and direction calling for close linkages with industries is very often insufficient. A plan of action and a "vehicle" needs to be identified for such a policy to really work and be effective. In the case of Malaysia, the policy of promoting close linkages with industries is specifically linked with the TSP programme. The Technical and Vocational Education Division is committed to the policy of promoting close linkages with industries and to the TSP programme, and is monitoring the TSP programme and its development and implementation closely.

`For such policy to work, the "Malaysian experience" has found that a vehicle needs to be established for the implementation of the policy. In our case, TSP was the vehicle. Having identified the vehicle, it is important for central agencies involved to acknowledge that the institutions need to be empowered and encouraged to initiate and make their own decisions for the success of the programmes. Guidelines formulated are meant to guide, and should not restrict or hinder the formulation and implementation of TSP programmes.

The promotion of closer linkages between technical and vocational education institutions and industries is considered important and of benefit to both the institutions and industry. Malaysia is still relatively new to both technical and vocational education and industrial development. We have set our goals and have identified our priorities. We are learning and are progressing in our own ways towards them. We hope to learn from others, their experiences and their country case studies to be presented. Malaysia is confident that this sharing of experiences will be of benefit to all countries involved in UNEVOC.